Kohji HASHIMOTO, et al
Electronic Control Unit
March 1, 2004
Richard C. Turner
(202) 293-7060
Q79445
1 of 15

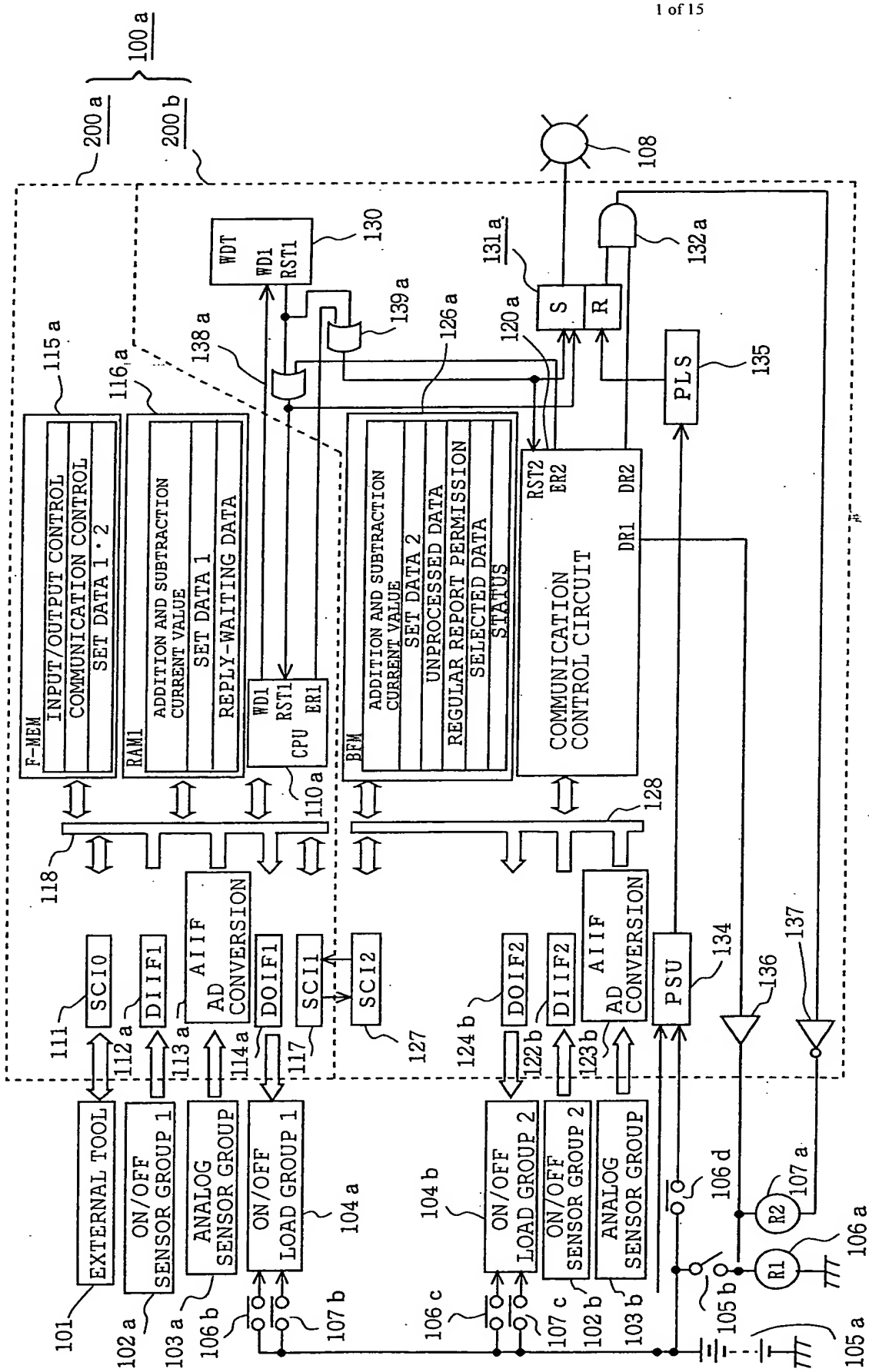

FIG. 1

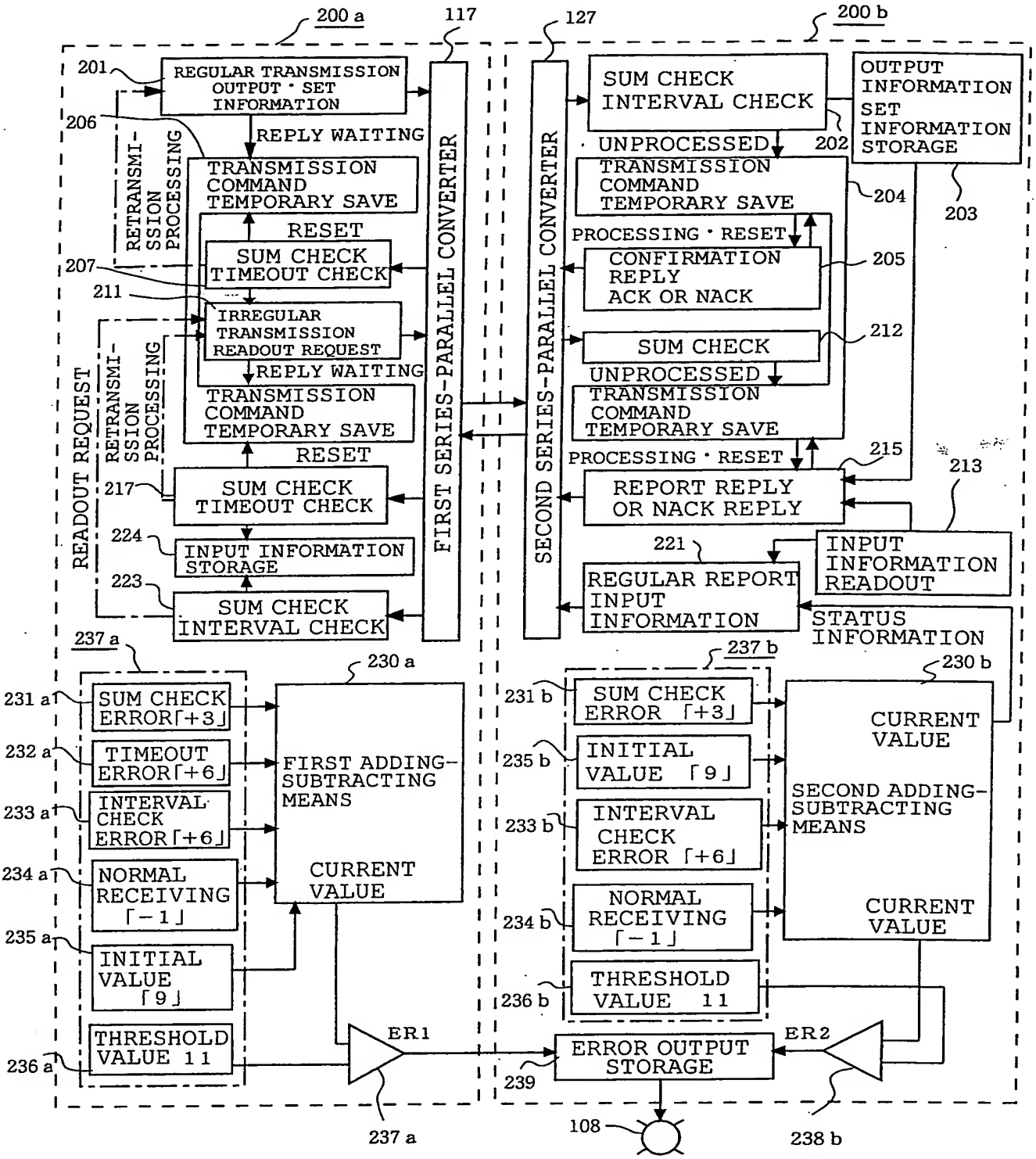
200 a
117
127
200 b
201
REGULAR TRANSMISSION OUTPUT · SET INFORMATION
206
REPLY WAITING
RETRANSMISSION PROCESSING
TRANSMISSION COMMAND TEMPORARY SAVE
RESET
SUM CHECK TIMEOUT CHECK
207
211
IRREGULAR TRANSMISSION READOUT REQUEST
REPLY WAITING
TRANSMISSION COMMAND TEMPORARY SAVE
RESET
READOUT REQUEST
RETRANSMISSION PROCESSING
217
SUM CHECK TIMEOUT CHECK
224
INPUT INFORMATION STORAGE
223
SUM CHECK INTERVAL CHECK
FIRST SERIES-PARALLEL CONVERTER
SECOND SERIES-PARALLEL CONVERTER
SUM CHECK INTERVAL CHECK
OUTPUT INFORMATION SET INFORMATION STORAGE
UNPROCESSED
202
TRANSMISSION COMMAND TEMPORARY SAVE
204
203
PROCESSING · RESET
CONFIRMATION REPLY ACK OR NACK
205
SUM CHECK
212
UNPROCESSED
TRANSMISSION COMMAND TEMPORARY SAVE
PROCESSING · RESET
215
213
REPORT REPLY OR NACK REPLY
221
INPUT INFORMATION READOUT
REGULAR REPORT INPUT INFORMATION
STATUS INFORMATION
237 a
230 a
237 b
230 b
231 a
SUM CHECK ERROR「+3」
232 a
TIMEOUT ERROR「+6」
233 a
INTERVAL CHECK ERROR「+6」
234 a
NORMAL RECEIVING 「−1」
235 a
INITIAL VALUE 「9」
236 a
THRESHOLD VALUE 11
FIRST ADDING-SUBTRACTING MEANS
CURRENT VALUE
231 b
SUM CHECK ERROR 「+3」
235 b
INITIAL VALUE 「9」
233 b
INTERVAL CHECK ERROR 「+6」
234 b
NORMAL RECEIVING 「−1」
236 b
THRESHOLD VALUE 11
CURRENT VALUE
SECOND ADDING-SUBTRACTING MEANS
CURRENT VALUE
ER1
ER2
ERROR OUTPUT STORAGE
239
237 a
108
238 b

FIG. 2

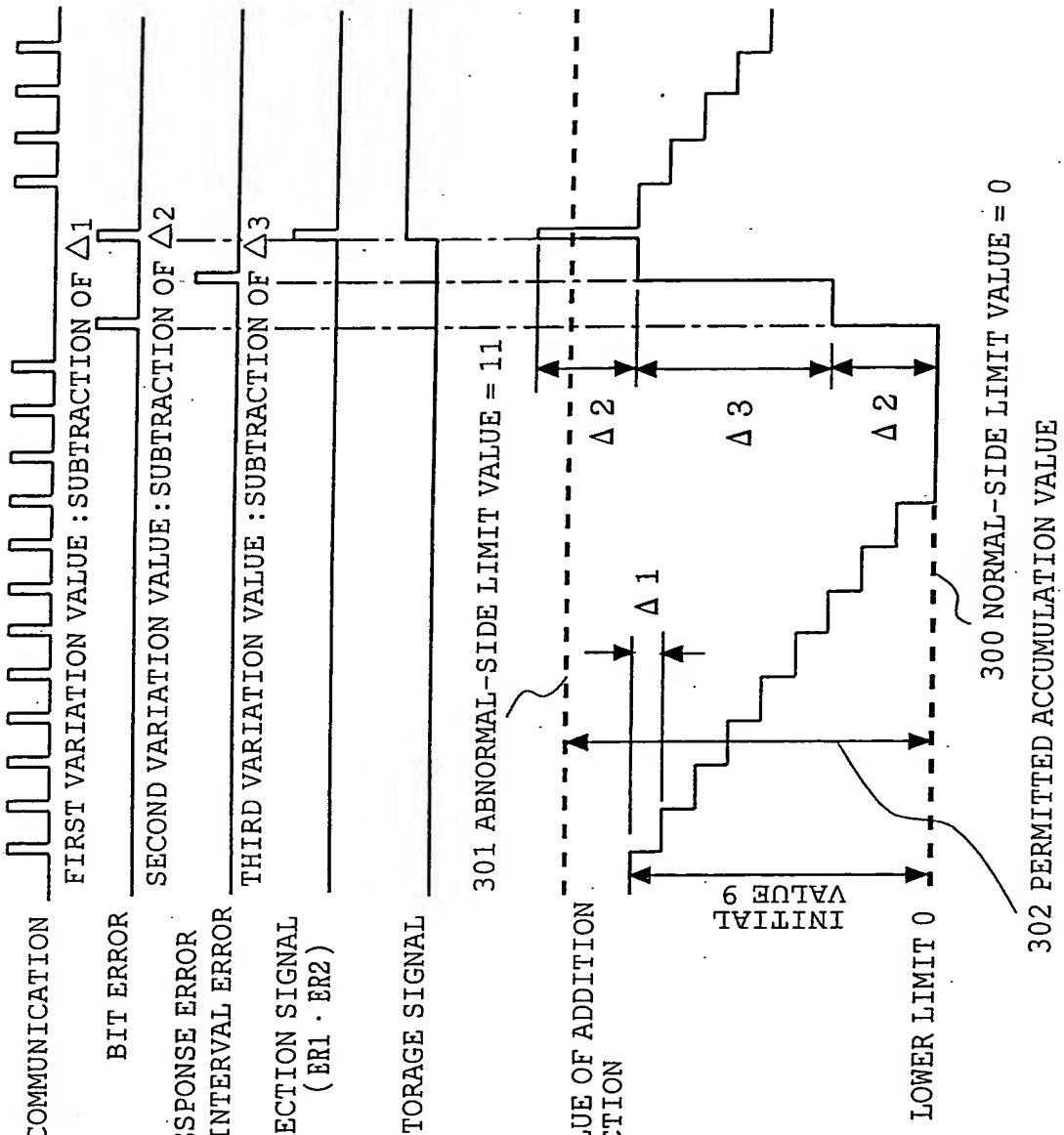
(a) NORMAL COMMUNICATION
FIRST VARIATION VALUE : SUBTRACTION OF Δ1
(b) BIT ERROR
SECOND VARIATION VALUE : SUBTRACTION OF Δ2
REPLY RESPONSE ERROR
(c) RECEIVING INTERVAL ERROR
THIRD VARIATION VALUE : SUBTRACTION OF Δ3
(d) ERROR DETECTION SIGNAL
(ER1 · ER2)
(e) ERROR STORAGE SIGNAL
301 ABNORMAL-SIDE LIMIT VALUE = 11
(f) CURRENT VALUE OF ADDITION AND SUBTRACTION
Δ 2
Δ 3
Δ 2
Δ 1
INITIAL VALUE 9
LOWER LIMIT 0
300 NORMAL-SIDE LIMIT VALUE = 0
302 PERMITTED ACCUMULATION VALUE

FIG. 3

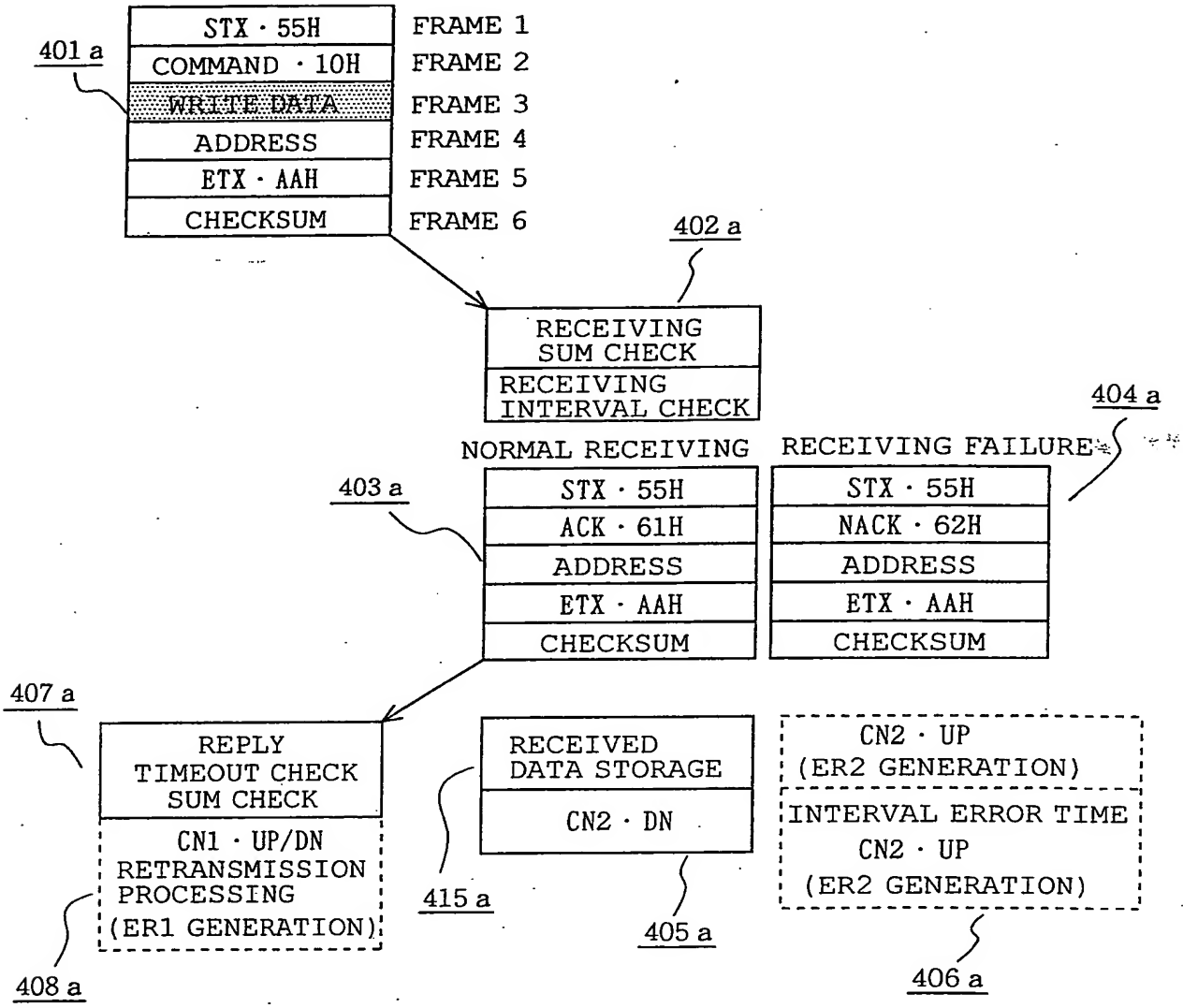
401 a
STX · 55H
COMMAND · 10H
WRITE DATA
ADDRESS
ETX · AAH
CHECKSUM
FRAME 1
FRAME 2
FRAME 3
FRAME 4
FRAME 5
FRAME 6
402 a
RECEIVING SUM CHECK
RECEIVING INTERVAL CHECK
404 a
NORMAL RECEIVING
RECEIVING FAILURE
403 a
STX · 55H
ACK · 61H
ADDRESS
ETX · AAH
CHECKSUM
STX · 55H
NACK · 62H
ADDRESS
ETX · AAH
CHECKSUM
407 a
REPLY TIMEOUT CHECK SUM CHECK
CN1 · UP/DN RETRANSMISSION PROCESSING (ER1 GENERATION)
408 a
RECEIVED DATA STORAGE
CN2 · DN
415 a
405 a
CN2 · UP (ER2 GENERATION)
INTERVAL ERROR TIME CN2 · UP (ER2 GENERATION)
406 a

FIG. 4

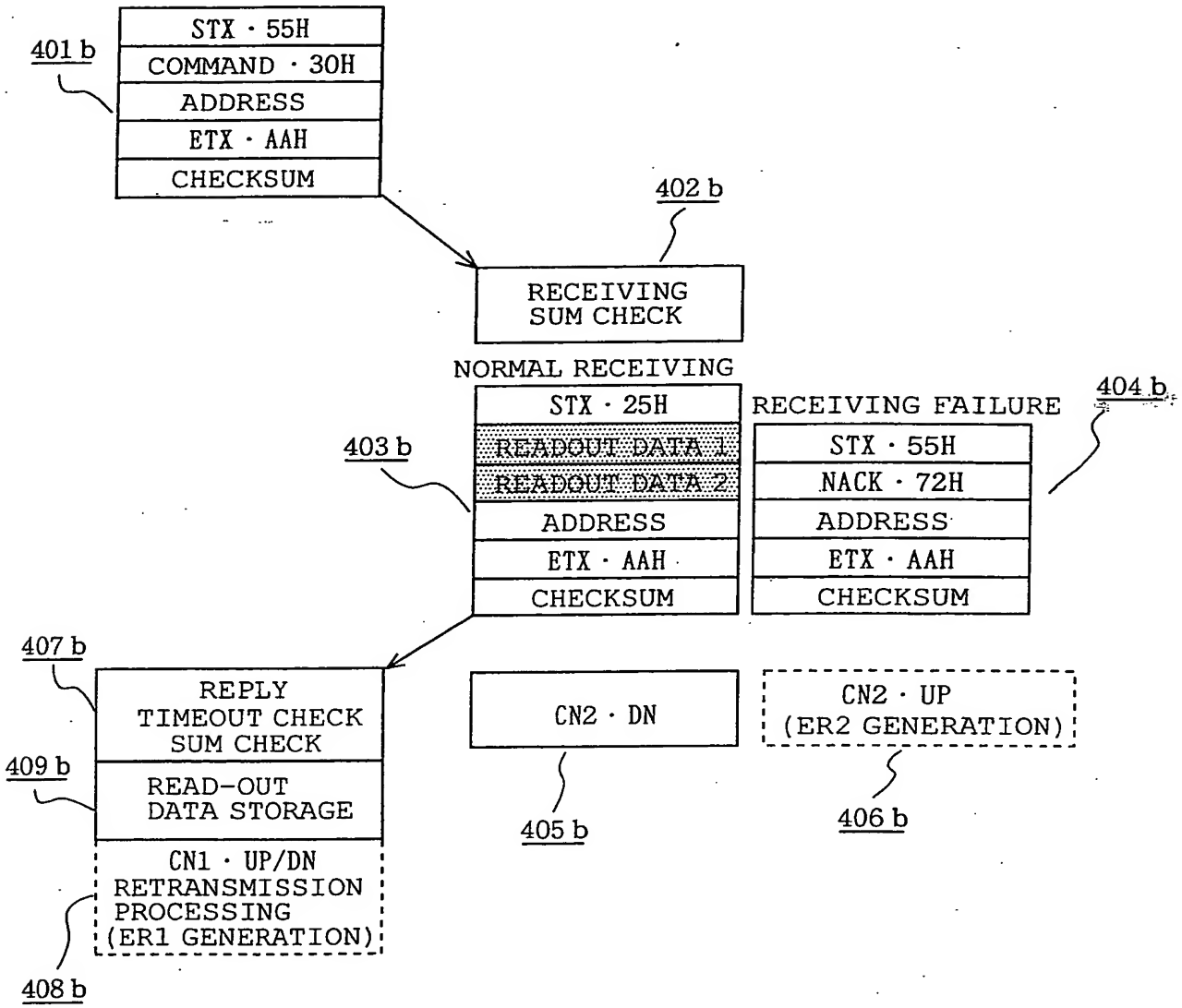
401 b
STX · 55H
COMMAND · 30H
ADDRESS
ETX · AAH
CHECKSUM
402 b
RECEIVING SUM CHECK
NORMAL RECEIVING
403 b
STX · 25H
READOUT DATA 1
READOUT DATA 2
ADDRESS
ETX · AAH
CHECKSUM
RECEIVING FAILURE
404 b
STX · 55H
NACK · 72H
ADDRESS
ETX · AAH
CHECKSUM
407 b
REPLY TIMEOUT CHECK SUM CHECK
409 b
READ-OUT DATA STORAGE
CN1 · UP/DN RETRANSMISSION PROCESSING (ER1 GENERATION)
408 b
CN2 · DN
405 b
CN2 · UP (ER2 GENERATION)
406 b

FIG. 5

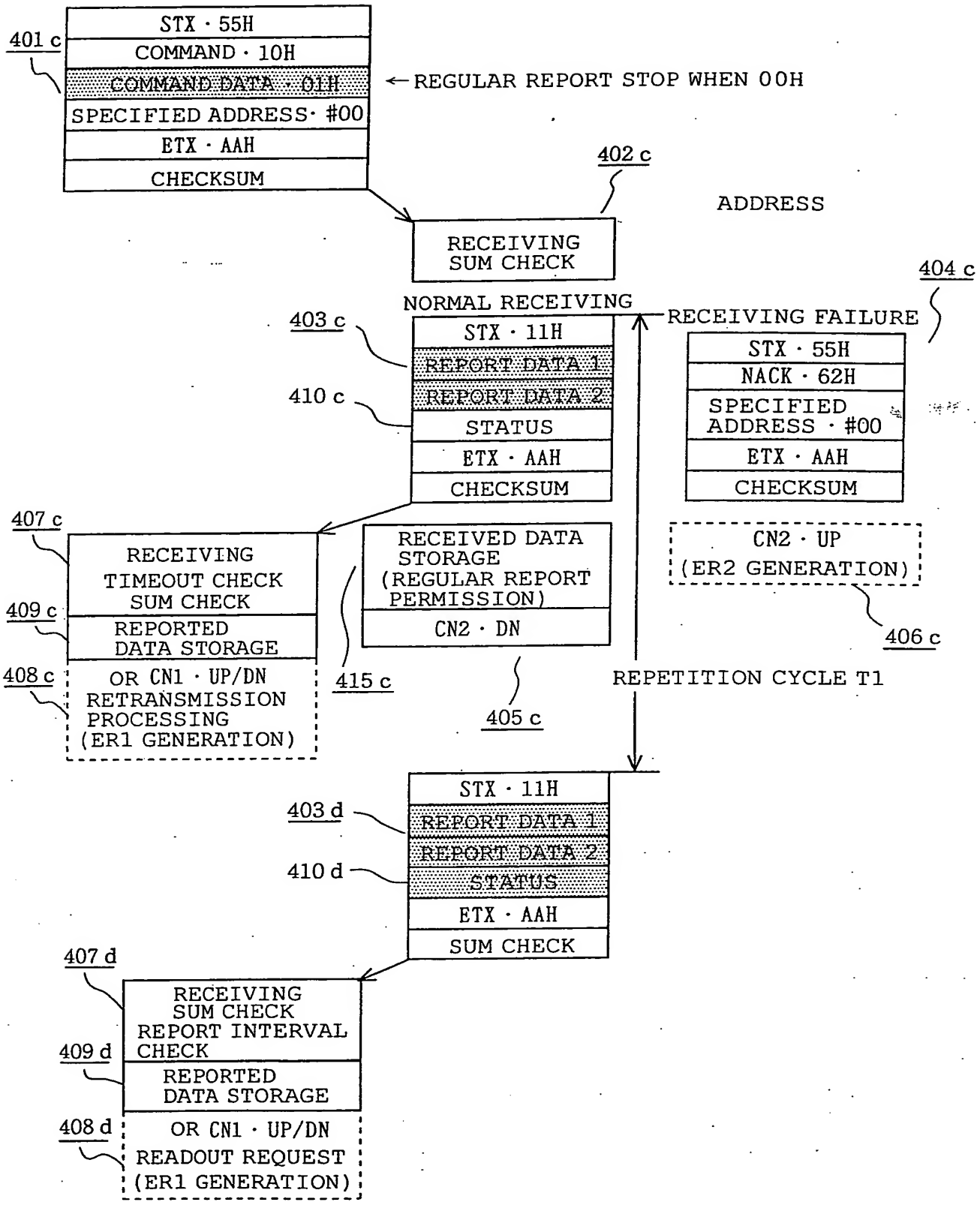
401 c
STX · 55H
COMMAND · 10H
COMMAND DATA · 01H
SPECIFIED ADDRESS· #00
ETX · AAH
CHECKSUM
← REGULAR REPORT STOP WHEN 00H
402 c
ADDRESS
RECEIVING SUM CHECK
NORMAL RECEIVING
RECEIVING FAILURE
404 c
403 c
STX · 11H
REPORT DATA 1
REPORT DATA 2
410 c
STATUS
ETX · AAH
CHECKSUM
STX · 55H
NACK · 62H
SPECIFIED ADDRESS · #00
ETX · AAH
CHECKSUM
407 c
RECEIVING TIMEOUT CHECK SUM CHECK
409 c
REPORTED DATA STORAGE
408 c
OR CN1 · UP/DN RETRANSMISSION PROCESSING (ER1 GENERATION)
RECEIVED DATA STORAGE (REGULAR REPORT PERMISSION)
CN2 · DN
415 c
405 c
CN2 · UP (ER2 GENERATION)
406 c
REPETITION CYCLE T1
403 d
STX · 11H
REPORT DATA 1
REPORT DATA 2
410 d
STATUS
ETX · AAH
SUM CHECK
407 d
RECEIVING SUM CHECK REPORT INTERVAL CHECK
409 d
REPORTED DATA STORAGE
408 d
OR CN1 · UP/DN READOUT REQUEST (ER1 GENERATION)

FIG. 6

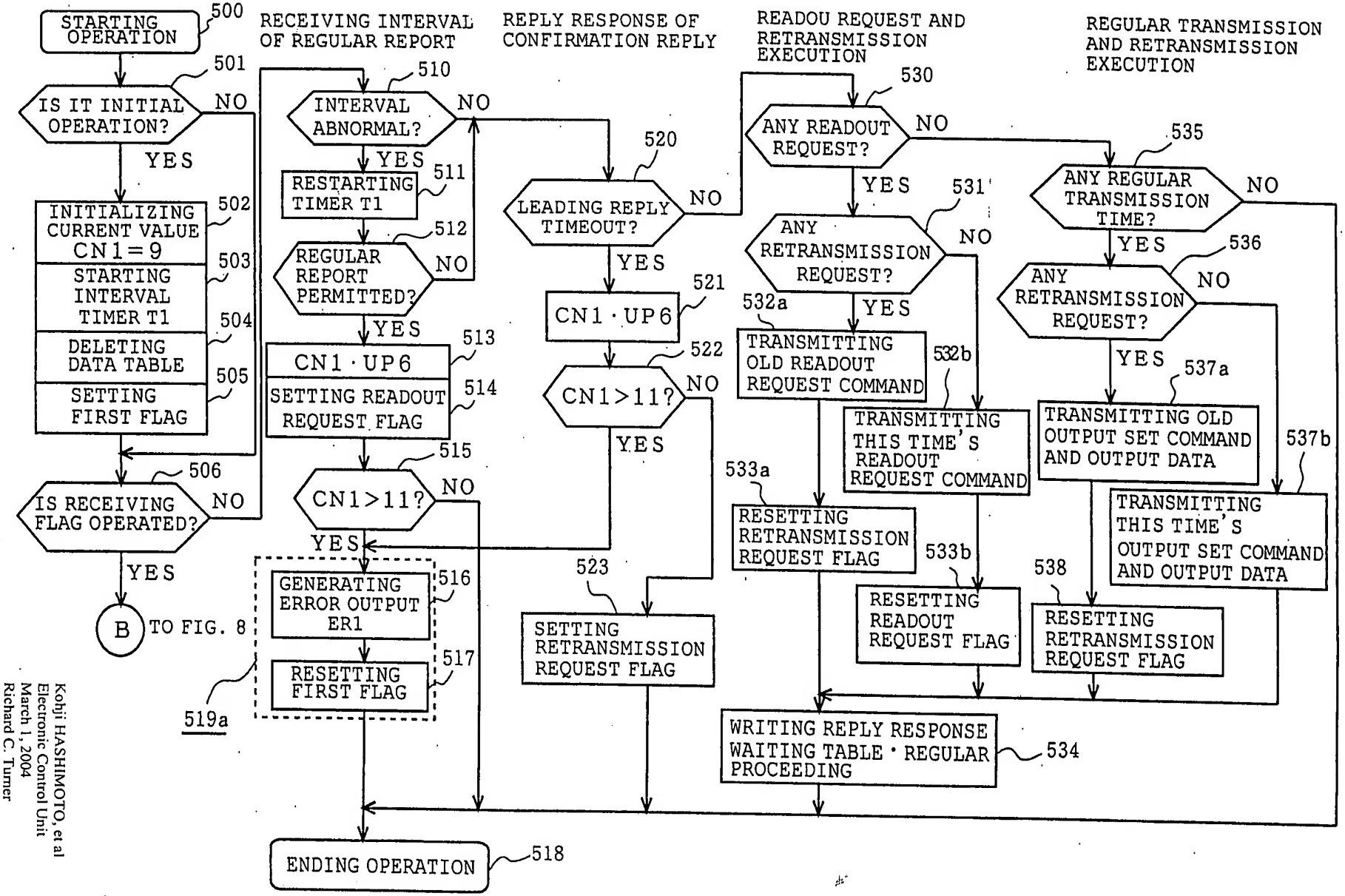

FIG. 7

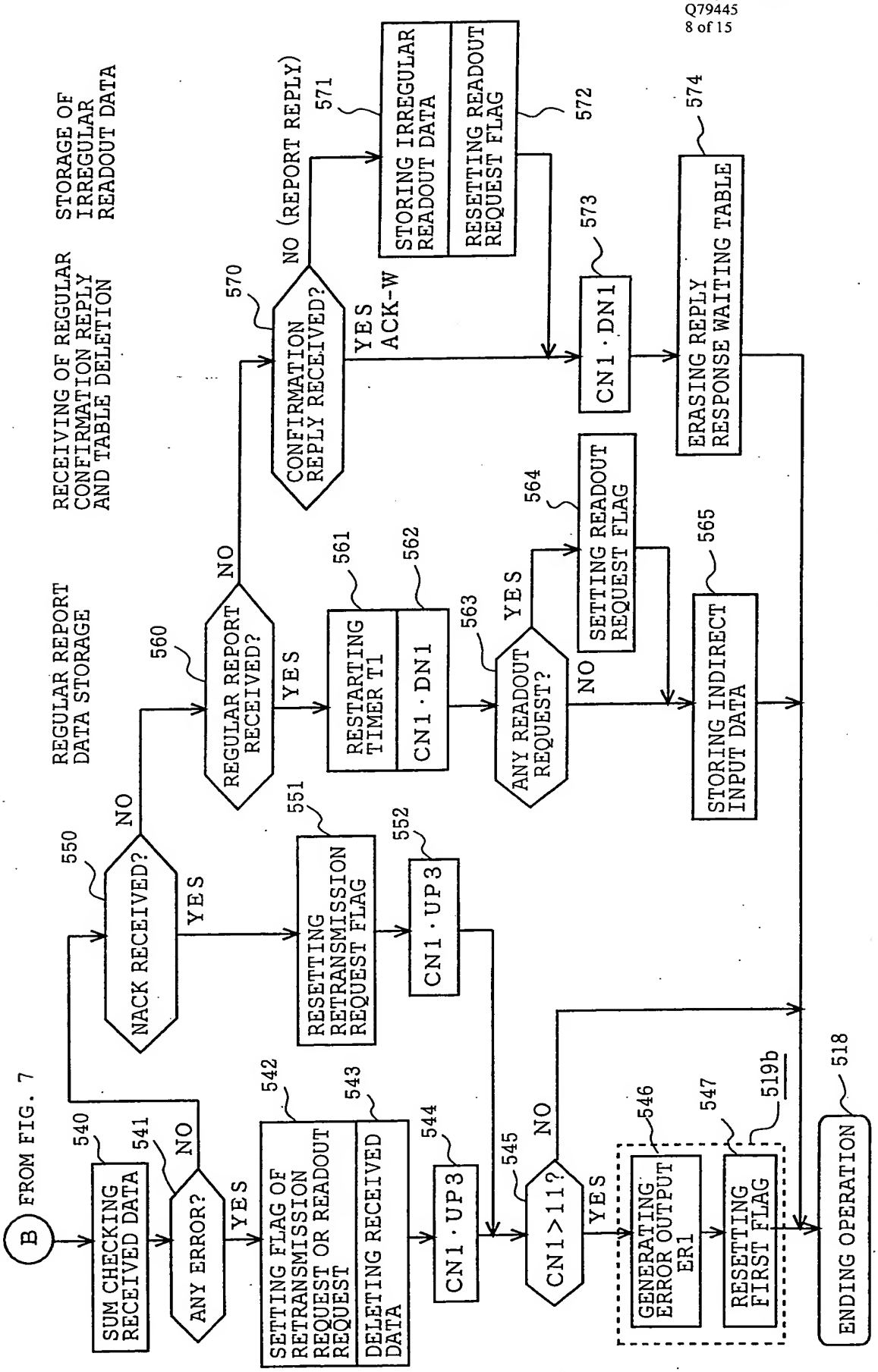
B
FROM FIG. 7
SUM CHECKING RECEIVED DATA
540
ANY ERROR?
541
NO
YES
SETTING FLAG OF RETRANSMISSION REQUEST OR READOUT REQUEST
542
DELETING RECEIVED DATA
543
CN1・UP3
544
CN1>11?
545
NO
YES
GENERATING ERROR OUTPUT ER1
546
RESETTING FIRST FLAG
547
519b
ENDING OPERATION
518
NACK RECEIVED?
550
NO
YES
RESETTING RETRANSMISSION REQUEST FLAG
551
CN1・UP3
552
REGULAR REPORT DATA STORAGE
REGULAR REPORT RECEIVED?
560
NO
YES
RESTARTING TIMER T1
561
CN1・DN1
562
ANY READOUT REQUEST?
563
YES
NO
SETTING READOUT REQUEST FLAG
564
STORING INDIRECT INPUT DATA
565
RECEIVING OF REGULAR CONFIRMATION REPLY AND TABLE DELETION
CONFIRMATION REPLY RECEIVED?
570
NO (REPORT REPLY)
YES ACK-W
STORAGE OF IRREGULAR READOUT DATA
STORING IRREGULAR READOUT DATA
571
RESETTING READOUT REQUEST FLAG
572
CN1・DN1
573
ERASING REPLY RESPONSE WAITING TABLE
574

FIG. 8

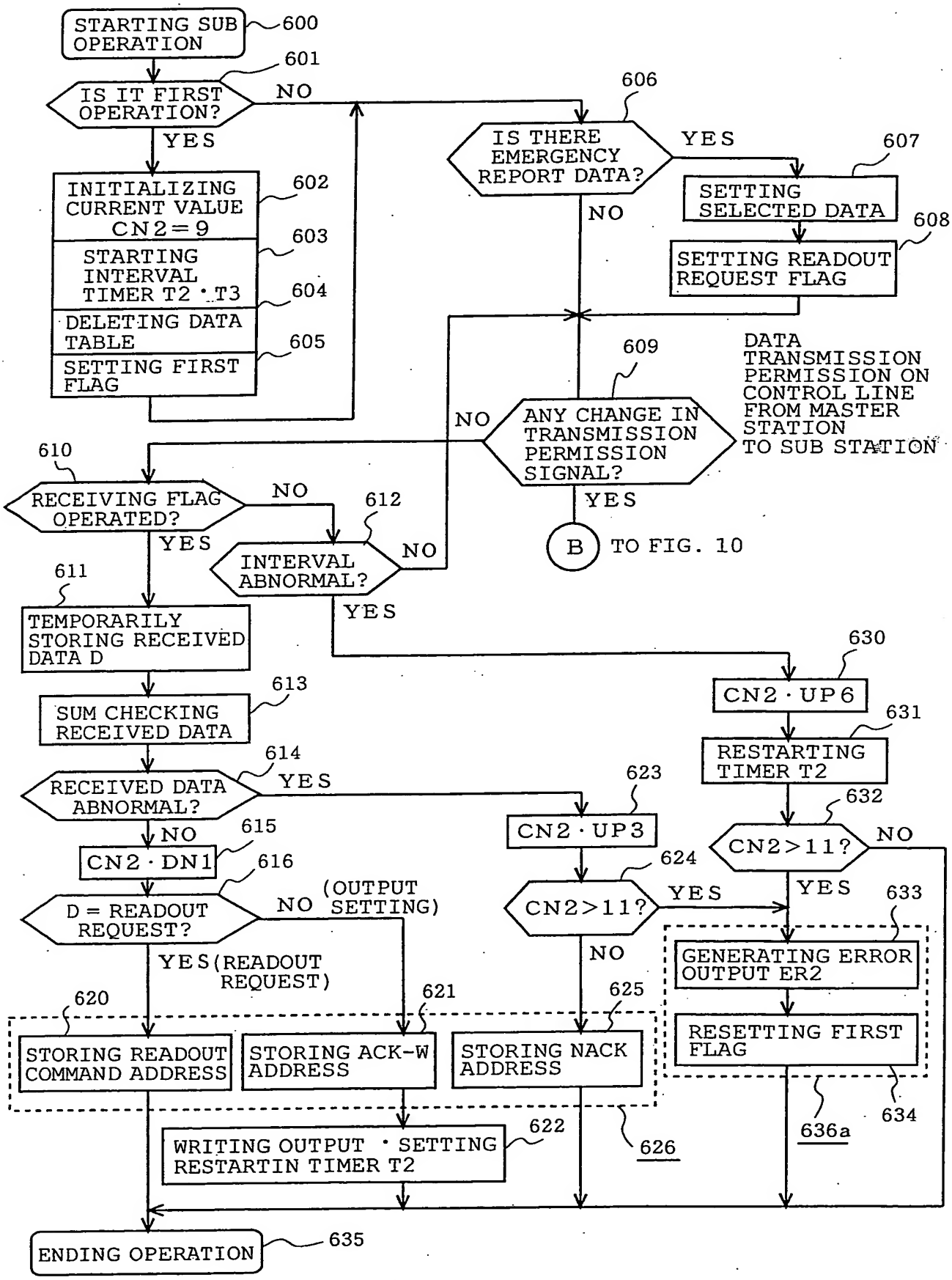
STARTING SUB OPERATION
600
IS IT FIRST OPERATION?
601
NO
YES
INITIALIZING CURRENT VALUE CN2=9
602
STARTING INTERVAL TIMER T2・T3
603
DELETING DATA TABLE
604
SETTING FIRST FLAG
605
IS THERE EMERGENCY REPORT DATA?
606
YES
NO
SETTING SELECTED DATA
607
SETTING READOUT REQUEST FLAG
608
ANY CHANGE IN TRANSMISSION PERMISSION SIGNAL?
609
NO
YES
DATA TRANSMISSION PERMISSION ON CONTROL LINE FROM MASTER STATION TO SUB STATION
B
TO FIG. 10
RECEIVING FLAG OPERATED?
610
NO
YES
INTERVAL ABNORMAL?
612
NO
YES
TEMPORARILY STORING RECEIVED DATA D
611
SUM CHECKING RECEIVED DATA
613
RECEIVED DATA ABNORMAL?
614
YES
NO
CN2・DN1
615
D = READOUT REQUEST?
616
NO (OUTPUT SETTING)
YES (READOUT REQUEST)
CN2・UP3
623
CN2>11?
624
YES
NO
CN2・UP6
630
RESTARTING TIMER T2
631
CN2>11?
632
NO
YES
GENERATING ERROR OUTPUT ER2
633
RESETTING FIRST FLAG
634
636a
620
STORING READOUT COMMAND ADDRESS
621
STORING ACK-W ADDRESS
625
STORING NACK ADDRESS
626
WRITING OUTPUT・SETTING RESTARTIN TIMER T2
622
ENDING OPERATION
635

FIG. 9

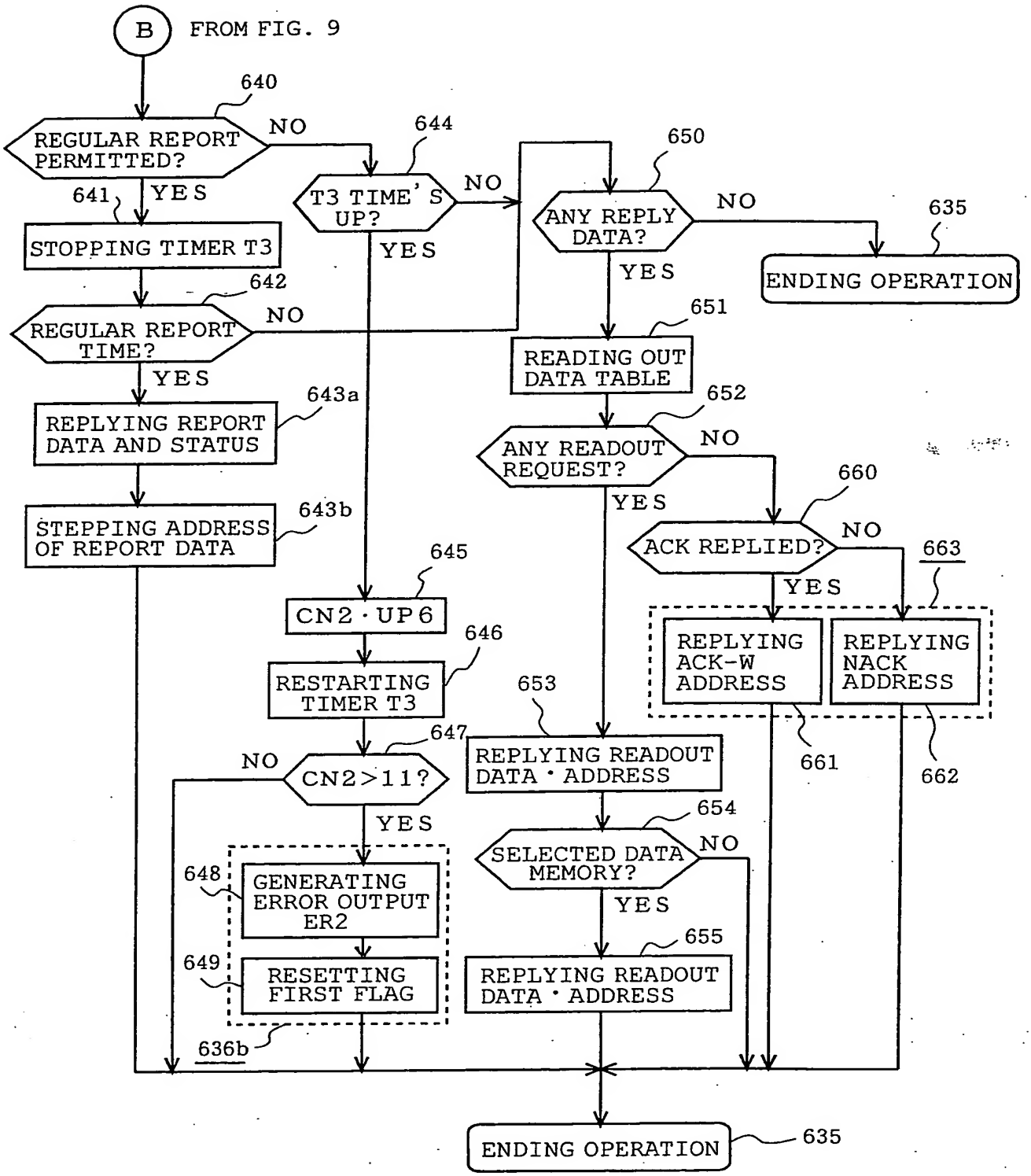
B
FROM FIG. 9
640
REGULAR REPORT PERMITTED?
NO
YES
641
STOPPING TIMER T3
642
REGULAR REPORT TIME?
NO
YES
643a
REPLYING REPORT DATA AND STATUS
643b
STEPPING ADDRESS OF REPORT DATA
644
T3 TIME' S UP?
NO
YES
645
CN2 · UP6
646
RESTARTING TIMER T3
647
CN2>11?
NO
YES
648
GENERATING ERROR OUTPUT ER2
649
RESETTING FIRST FLAG
636b
650
ANY REPLY DATA?
NO
YES
635
ENDING OPERATION
651
READING OUT DATA TABLE
652
ANY READOUT REQUEST?
NO
YES
660
ACK REPLIED?
NO
YES
663
REPLYING ACK-W ADDRESS
REPLYING NACK ADDRESS
661
662
653
REPLYING READOUT DATA · ADDRESS
654
SELECTED DATA MEMORY?
NO
YES
655
REPLYING READOUT DATA · ADDRESS
ENDING OPERATION
635

FIG. 10

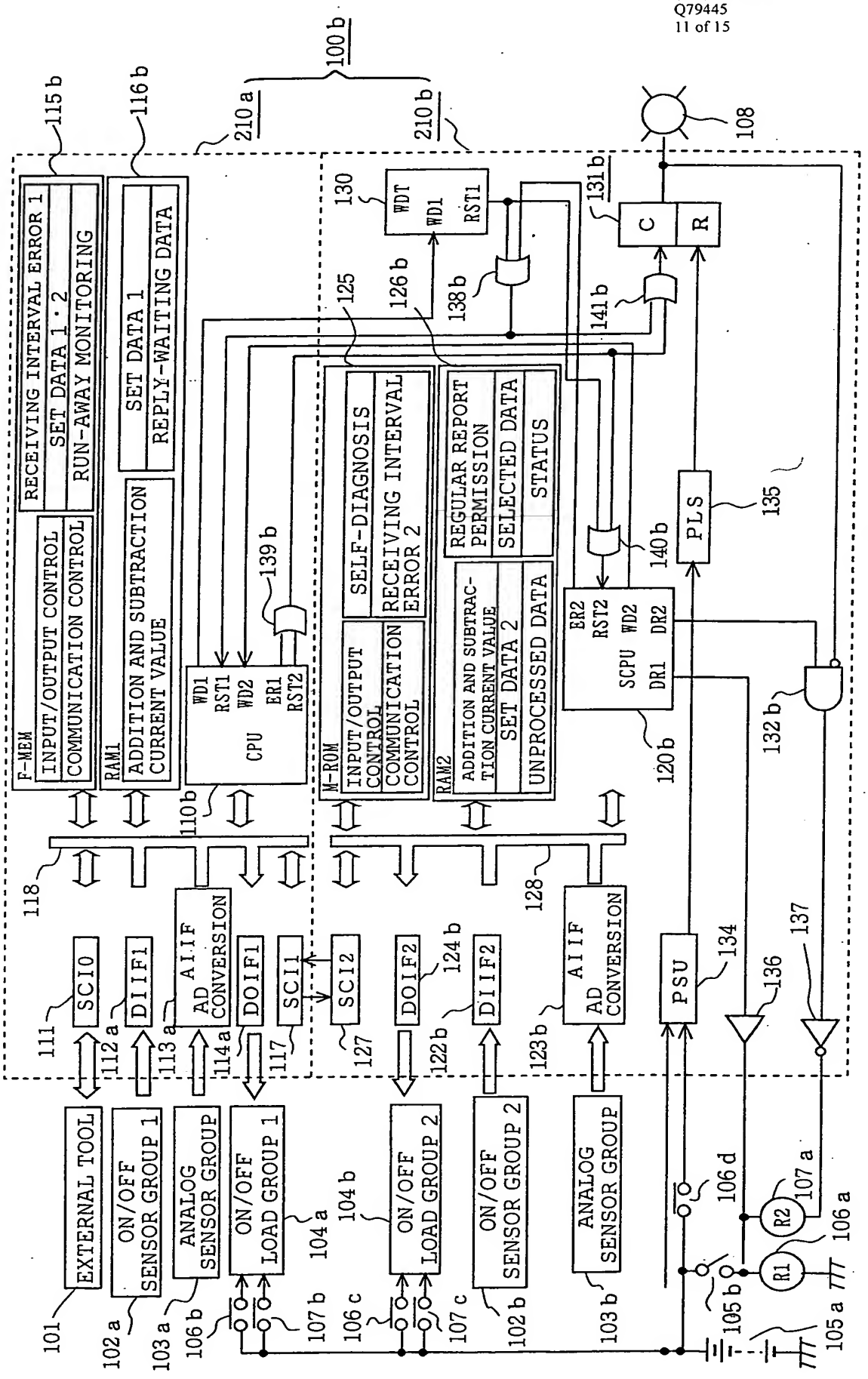
100 b
210 a
210 b
115 b
116 b
108
F-MEM
RECEIVING INTERVAL ERROR 1
SET DATA 1・2
RUN-AWAY MONITORING
INPUT/OUTPUT CONTROL
COMMUNICATION CONTROL
RAM1
SET DATA 1
REPLY-WAITING DATA
ADDITION AND SUBTRACTION CURRENT VALUE
CPU
WD1
RST1
WD2
ER1
RST2
110 b
139 b
M-ROM
INPUT/OUTPUT CONTROL
COMMUNICATION CONTROL
SELF-DIAGNOSIS
RECEIVING INTERVAL ERROR 2
125
RAM2
ADDITION AND SUBTRACTION CURRENT VALUE
SET DATA 2
UNPROCESSED DATA
REGULAR REPORT PERMISSION
SELECTED DATA
STATUS
126 b
130
WDT
WD1
RST1
138 b
131 b
C
R
141 b
140 b
PLS
135
ER2
RST2
WD2
SCPU
DR1
DR2
120 b
132 b
118
128
SCI0
DI IF1
AI IF
AD CONVERSION
DO IF1
SCI1
SCI2
DO IF2
DI IF2
AI IF
AD CONVERSION
PSU
134
136
137
111
112 a
113 a
114 a
117
127
122 b
124 b
123 b
EXTERNAL TOOL
ON/OFF SENSOR GROUP 1
ANALOG SENSOR GROUP
ON/OFF LOAD GROUP 1
ON/OFF LOAD GROUP 2
ON/OFF SENSOR GROUP 2
ANALOG SENSOR GROUP
101
102 a
103 a
106 b
104 a
104 b
107 b
106 c
107 c
102 b
103 b
106 d
107 a
R2
R1
106 a
105 b
105 a

FIG. 11

ADDRESS	b7	b6	b5	b4	b3	b2	b1	b0	
00									REGULAR REPORT PERMISSION
01									NORMAL-SIDE LIMIT VALUE
02									ABNORMAL-SIDE LIMIT VALUE
03									INITIALIZATION VALUE
04									FIRST VARIATION VALUE
05									SECOND VARIATION VALUE
06									THIRD VARIATION VALUE
07									REPLY RESPONSE ACCEPTABLE TIME PERIOD
08									RECEIVING INTERVAL ACCEPTABLE TIME PERIOD
09									
0A	YO7	YO6	YO5	YO4	YO3	YO2	DR2	DR1	INDIRECT OUTPUT 1
0B	Y17	Y16	Y15	Y14	Y13	Y12	Y11	Y10	INDIRECT OUTPUT 2

REGULAR TRANSMISSION ORDER IS ALTERNATE TRANSMISSION OF 0A AND 0B

FIG. 12

Kohji HASHIMOTO, et al
Electronic Control Unit
March 1, 2004
Richard C. Turner
(202) 293-7060
Q79445
12 of 15

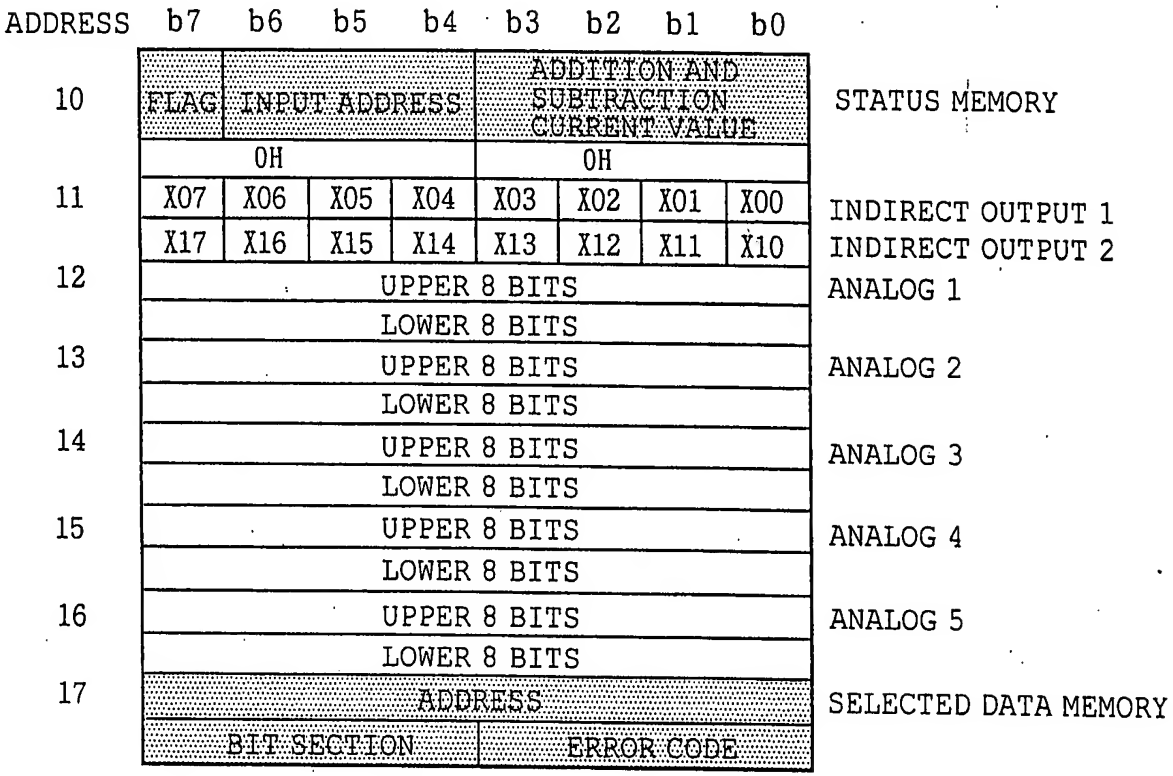

FIG. 13

Kohji HASHIMOTO, et al
Electronic Control Unit
March 1, 2004
Richard C. Turner
(202) 293-7060
Q79445
13 of 15

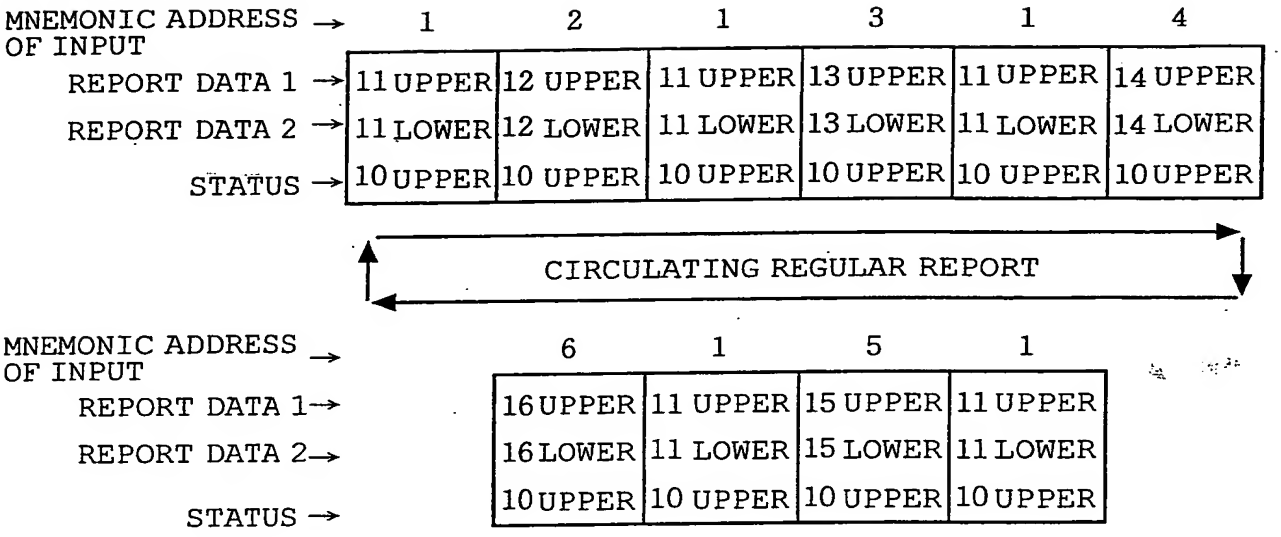
MNEMONIC ADDRESS OF INPUT
1
2
1
3
1
4
REPORT DATA 1
11 UPPER
12 UPPER
11 UPPER
13 UPPER
11 UPPER
14 UPPER
REPORT DATA 2
11 LOWER
12 LOWER
11 LOWER
13 LOWER
11 LOWER
14 LOWER
STATUS
10 UPPER
10 UPPER
10 UPPER
10 UPPER
10 UPPER
10 UPPER
CIRCULATING REGULAR REPORT
MNEMONIC ADDRESS OF INPUT
6
1
5
1
REPORT DATA 1
16 UPPER
11 UPPER
15 UPPER
11 UPPER
REPORT DATA 2
16 LOWER
11 LOWER
15 LOWER
11 LOWER
STATUS
10 UPPER
10 UPPER
10 UPPER
10 UPPER

FIG. 14

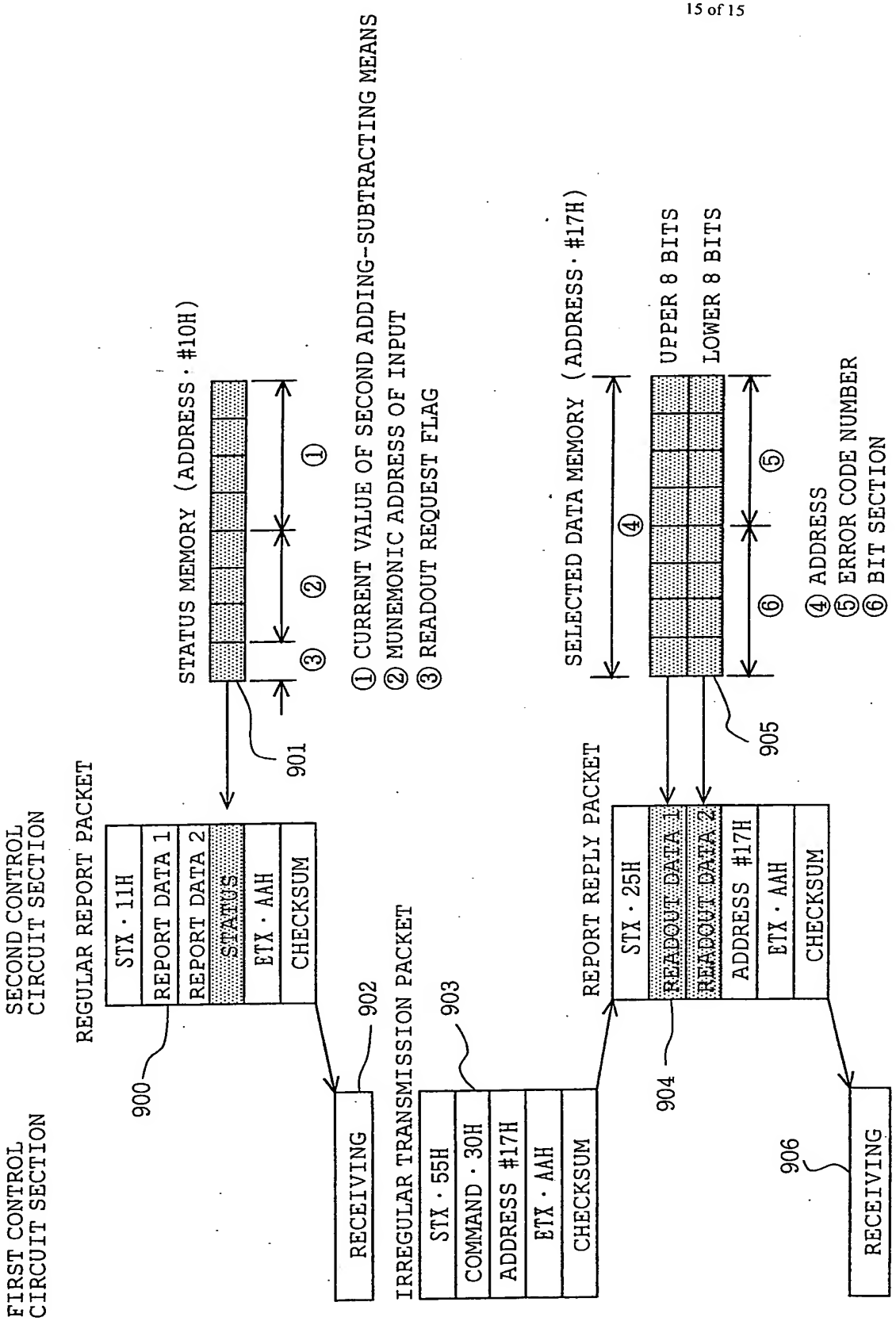
FIRST CONTROL CIRCUIT SECTION
SECOND CONTROL CIRCUIT SECTION
REGULAR REPORT PACKET
STX · 11H
REPORT DATA 1
REPORT DATA 2
STATUS
ETX · AAH
CHECKSUM
STATUS MEMORY (ADDRESS · #10H)
① CURRENT VALUE OF SECOND ADDING-SUBTRACTING MEANS
② MUNEMONIC ADDRESS OF INPUT
③ READOUT REQUEST FLAG
900
901
902
RECEIVING
IRREGULAR TRANSMISSION PACKET
STX · 55H
COMMAND · 30H
ADDRESS #17H
ETX · AAH
CHECKSUM
903
REPORT REPLY PACKET
STX · 25H
READOUT DATA 1
READOUT DATA 2
ADDRESS #17H
ETX · AAH
CHECKSUM
SELECTED DATA MEMORY (ADDRESS · #17H)
UPPER 8 BITS
LOWER 8 BITS
④ ADDRESS
⑤ ERROR CODE NUMBER
⑥ BIT SECTION
904
905
906
RECEIVING

FIG. 15